CLAIMS

1. A method of predicting the failure of a rock formation surrounding a subterranean cavity, comprising the steps of

- measuring a set of parameters relating to pressure conditions and stresses in the rock formation surrounding the subterranean cavity;

- using the set of parameters to determine a rock strength;

- determining a first characteristic length relating to the size of the cavity;

- determining a second characteristic length relating to the grain size of the rock formation surrounding the cavity;

- using the first and second characteristic lengths to determine a correction for the rock strength;

- correcting said rock strength; and

- using a failure criterion and the corrected rock strength to predict a condition under which the rock formation is expected to a fail producing debris.

2. The method according to claim 1 wherein the set parameters includes sonic wave slowness.

3. The method according to claim 1 wherein the set parameters includes the formation density.

4. The method according to claim 1 wherein the set parameters includes the wellbore and formation pressure.

5. The method according to claim 1 wherein the failure criterion is a shear failure criterion (Mohr-Coulomb).

6. The method according to claim 1 wherein the failure criterion includes a term corresponding to an uniaxial compressive strength (UCS).

7 The method according to claim 1 wherein the correction includes forming the quotient of the first and the second characteristic length.

8. The method according to claim 1 further including the step of determining a wellbore production pressure using the failure criterion.

9. The method of claim 1 wherein the set of parameters relating to pressure conditions and stresses in the rock formation surrounding the cavity are at least partly measured while drilling.